

Express Mail No. EV530944078US
International Application No. PCT/SE2004/000406
International Filing Date: 19 March 2004
Preliminary Amendment Accompanying
Substitute Specification

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An isostatic press for high pressure treatment of a product having a temperature below 0°C, comprising:
a pressure chamber adapted to contain a first pressure medium;;
a container which is placeable in the pressure chamber and which is adapted to hold the product and a second pressure medium;; and
the container being closable to keep the second pressure medium separated from the first pressure medium and being provided with a pressure transfer meansdevice for transfer pressure from the first pressure medium to the second pressure medium, and the container comprising a body which is made of a material having low adiabatic heat emission relative to adjoining substances, so that the body from adjoining substances absorbs heat which is generated by adiabatic temperature rise during the high pressure treatment.
2. (Currently Amended) ~~An~~The isostatic press as claimed in claim 1; wherein the body constitutes at least part of ~~the~~a container wall of the container.
3. (Currently Amended) ~~An~~The isostatic press as claimed in claim 2; wherein the container wall comprises an inner wall round the outside of which a substance in the form of an insulation is arranged to counteract thermal transfer between the first pressure medium and the second pressure medium, the body constituting at least part of the inner wall, said body counteracting ~~that~~thermal passing of adiabatic heat

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emission from the insulation, due to compression during the high pressure treatment, thermally passes to the second pressure medium and the product.

4. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3; wherein the container is arranged with an outer wall and the insulation is arranged between the inner and the outer wall.

5. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3 or 4; wherein the inner wall of the container is ~~essentially~~substantially rigid and at least part of the pressure transfer ~~means~~device of the container is movably arranged relative to said inner wall to enable a change of volume of the second pressure medium for the purpose of eliminating a pressure difference between the first pressure medium and the second pressure medium.

6. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one of the preceding claims~~claim 1; wherein the pressure transfer ~~means~~device is arranged as a loose piston, ~~preferably constituting a closable lid on the container~~, adapted to transfer a pressure change in the first pressure medium to the second pressure medium, and to separate the first pressure medium from fluid communication with the second pressure medium.

7. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one of claims 1-5~~claim 1; wherein the pressure transfer ~~means~~device is arranged as a flexible membrane, ~~preferably constituting a closable lid on the container~~, adapted to transfer a pressure change in the first pressure medium to the second pressure medium and to separate the first pressure medium from fluid communication with the second pressure medium.

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8. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one of the preceding claims~~claim 1; wherein a plurality of containers can be placed in the same pressure chamber of the isostatic press for simultaneous treatment of the product in each container.
9. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3 ~~or any one of claims 4-8 in combination with claim 3~~, wherein the inner wall is made of metal, ~~preferably stainless steel~~.
10. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3 ~~or any one of claims 4-9 in combination with claim 3~~, wherein the inner wall has a thickness which is at least 5 mm, ~~preferably 5-15 mm, particularly 8-12 mm~~.
11. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3 ~~or any one of claims 4-10 in combination with claim 3~~, wherein the insulation is made of a polymer, ~~preferably EPDM (ethylene propylene rubber) or natural rubber~~.
12. (Currently Amended) ~~An~~The isostatic press as claimed in claim 3 ~~or any one of claims 4-11 in combination with claim 3~~, wherein the insulation has a thickness which is at least 5 mm, ~~preferably 5-15 mm, particularly 8-12 mm~~.
13. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one of the preceding claims~~claim 1; wherein a valve ~~means~~ is arranged on the container to enable discharge of a possible residual volume of air in the container when the container holds the product and the second pressure medium.

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14. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one~~ of the preceding claims claim 1; wherein the second pressure medium is a liquid with a freezing point below 0°C, ~~such as ethanol or some other alcohol, or a mixture of water and alcohol.~~

15. (Currently Amended) ~~An~~The isostatic press as claimed in ~~any one~~ of the preceding claims claim 1; wherein the first pressure medium is a liquid, ~~preferably water or a mixture of water and alcohol, such as a mixture of water and glycol.~~

16. (Currently Amended) A method for high pressure treatment of a product by means of an isostatic press comprising a pressure chamber adapted to hold a first pressure medium, comprising the steps of:

providing at least one closed container which holds a second pressure medium and a product whose temperature is below 0°C;

placing the container in the pressure chamber of the isostatic press;

~~pressurising~~pressurizing the pressure chamber by means of the first pressure medium;

transferring a pressure change of the first pressure medium to the second pressure medium to subject the product held in the closed container to high pressure treatment; and

keeping the temperature of the product below 0°C throughout the high pressure treatment by absorbing heat which is generated by adiabatic temperature rise during the high pressure treatment.

17. (Currently Amended) ~~A~~The method as claimed in claim 16, further comprising keeping the product in a frozen state throughout the high pressure treatment.

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18. (Currently Amended) ~~A~~The method as claimed in claim 17, further comprising, if the product reaches a temperature where there is a phase change from solid phase to liquid phase, keeping the product frozen throughout the high pressure treatment by ~~utilising~~utilizing consumption of melting heat.

19. (Currently Amended) ~~A~~The method as claimed in ~~any one of claims 16-18~~ claim 16, further comprising counteracting thermal transfer between the first pressure medium and the second pressure medium by selecting a container provided with thermal insulation.

20. (Currently Amended) ~~A~~The method as claimed in ~~any one of claims 16-19~~ claim 16, further comprising counteracting, during the high pressure treatment, by means of a body arranged in the container ~~that thermal passing of emitted~~ thermal passing of emitted adiabatic heat from the insulation, due to compression during high pressure treatment, ~~thermally passes to the second pressure medium.~~

21. (Currently Amended) ~~A~~The method as claimed in claim 20, further comprising absorbing said emitted adiabatic heat from the insulation by selecting a container where the body is positioned between the insulation and the second pressure medium, the body constituting at least part of the container wall.

22. (Currently Amended) ~~A~~The method as claimed in ~~any one of claims 16-21~~ claim 16, further comprising transferring the pressure of the first pressure medium to the second pressure medium by compressing the second pressure medium in the container so that pressure ~~equalisation~~equalization is achieved between the first pressure medium and the second pressure medium.

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23. (Currently Amended) ~~A~~The method as claimed in ~~any one of~~
~~claims 16-22~~ claim 16, further comprising cooling the container and the second pressure
medium, ~~which preferably is performed simultaneously,~~ to a temperature below 0°C;
~~preferably between -5 and -30°C, such as -10 to -25°C.~~

24. (Currently Amended) ~~A~~The method as claimed in claim 23,
further comprising placing in the cooled container the product having a temperature
below 0°C, ~~preferably between -5 and -30°C, such as -10 to -25°C.~~

25. (Currently Amended) ~~A~~The method as claimed in ~~any one of~~
~~claims 16-24~~ claim 16, further comprising discharging a possible residual volume of air
from the container holding the product and the second pressure medium before the
pressure chamber is ~~pressurised~~pressurized, ~~preferably before the container is placed~~
~~in the pressure chamber.~~

26. (Currently Amended) ~~A~~The method as claimed in ~~any one of~~
~~claims 16-25~~ claim 16, further comprising subjecting the product to high pressure
treatment for 0.5-20 min, ~~preferably 0.5-10 min, particularly 2-7 min.~~

27. (Currently Amended) ~~A~~The method as claimed in ~~any one of~~
~~claims 16-26~~ claim 16, further comprising subjecting the product to high pressure
treatment at a pressure of 2000-15000 bar, ~~preferably 2000-10000 bar, particularly~~
~~5000-7000 bar.~~

28. (Currently Amended) ~~A~~The method as claimed in ~~any one of~~
~~claims 16-27~~ claim 16, further comprising decompressing the high pressure press and then
removing the container from the pressure chamber after the high pressure treatment.

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29. (Currently Amended) A container adapted to subject, by means of an isostatic press, a product having a temperature below 0°C, which is placeable in the container, to high pressure treatment, comprising:

a closure adapted to separate the inside of the container from the surroundings of the container;

a pressure transfer ~~means~~device for transferring pressure from the surroundings of the container to the inside of the container; and

a body which is made of a material having low adiabatic heat emission relative to adjoining substances, so that the body from adjoining substances absorbs heat which is generated by adiabatic temperature rise during the high pressure treatment.

30. (Currently Amended) ~~A~~The container as claimed in claim 29; wherein the body constitutes at least part of ~~the~~a container wall of the container.

31. (Currently Amended) ~~A~~The container as claimed in claim 30; wherein the container wall comprises an inner wall round the outside of which a substance in the form of an insulation is arranged to counteract thermal transfer between the surroundings of the container and the inside of the container, the body constituting at least part of the inner wall, said body counteracting ~~that thermal passing of~~ adiabatic heat emission from the insulation, due to compression during the high pressure treatment, ~~thermally passes to~~ the inside of the container.

32. (Currently Amended) ~~A~~The container as claimed in claim 31; wherein the container is arranged with an outer wall and the insulation is arranged between the inner and the outer wall.

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33. (Currently Amended) ~~A~~The container as claimed in claim 31 ~~or~~ 32, wherein the inner wall of the container is ~~essentially-substantially~~ rigid and at least part of the pressure transfer ~~means~~device of the container is movably arranged relative to said inner wall to enable a change of volume of the inner volume of the container for the purpose of eliminating a pressure difference between the surroundings of the container and the inside of the container.

34. (Currently Amended) ~~A~~The container as claimed in ~~any one of~~ ~~claims 29-33~~claim 29, wherein the pressure transfer ~~means~~device is arranged as a loose piston, ~~preferably constituting a closable lid on the container~~, adapted to transfer a pressure change of the surroundings of the container to the inside of the container and to separate the inside of the container from the surroundings of the container.

35. (Currently Amended) ~~A~~The container as claimed in ~~any one of~~ ~~claims 29-33~~claim 29, wherein the pressure transfer ~~means~~device is arranged as a flexible membrane, ~~preferably constituting a closable lid on the container~~, adapted to transfer a pressure change of the surroundings of the container to the inside of the container, and to separate the inside of the container from the surroundings of the container.

36. (Currently Amended) ~~A~~The container as claimed in ~~claims 31 or~~ ~~any one of claims 32-35 in combination with claim 31~~, wherein the inner wall is made of metal, ~~preferably stainless steel~~.

37. (Currently Amended) ~~A~~The container as claimed in claim 31 ~~or~~ ~~any one of claims 32-36 in combination with claim 31~~, wherein the inner wall has a thickness which is at least 5 mm, ~~preferably 5-15 mm, particularly 8-12 mm~~.

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38. (Currently Amended) ~~A~~The container as claimed in claim 31 ~~or any one of claims 32-37 in combination with claim 31~~, wherein the insulation is made of a polymer, preferably EPDM (ethylene propylene rubber) ~~or natural rubber~~.

39. (Currently Amended) ~~A~~The container as claimed in claim 31 ~~or any one of claims 32-38 in combination with claim 31~~, wherein the insulation has a thickness which is at least 5 mm, preferably 5-15 mm, particularly 8-12 mm.

40. (Currently Amended) ~~A~~The container as claimed in ~~any one of claims 29-39~~ claim 29, wherein a valve means is arranged on the container to enable discharge of a possible residual volume of air in the container when the container holds the product and a pressure medium.

41. (Currently Amended) ~~A~~The container as claimed in ~~any one of claims 29-40~~ claim 29, wherein the container is adapted to transfer, by the pressure transfer means device, a liquid pressure from the outside of the container to a liquid on the inside of the container, said liquid having a freezing point below 0°C, ~~such as ethanol~~.

42. (Currently Amended) A plant for high pressure treatment of products having a temperature below 0°C, comprising:

a freezing device, such as a freezing chamber; and

an isostatic press comprising a pressure chamber adapted to contain a first pressure medium, a container which is placeable in the pressure chamber and which is adapted to hold the product and a second pressure medium, the container being closable to keep the second pressure medium separated from the first pressure medium and being provided with a pressure transfer device for transfer pressure from the first pressure medium to the second pressure medium, and the container comprising a body which is

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made of a material having low adiabatic heat emission relative to adjoining substances, so
that the body from adjoining substances absorbs heat which is generated by adiabatic
temperature rise during the high pressure treatment~~as claimed in any one of claims 1-15.~~

43. (Canceled)